

WHAT IS CLAIMED IS:

1. A circuit comprising:

a plurality of components sharing at least one shared resource,

and

a lottery manager, the lottery manager being adapted to receive

5 request for ownership for said at least one shared resource from a subset of the plurality of components,

each of the subset of the plurality of components being assigned lottery tickets,

the lottery manager being adapted to probabilistically choose

10 one component from the subset of the plurality of components for assigning said at least one shared resource,

the probabilistically choosing being weighted based on a number of lottery tickets being assigned to each of the subset of the plurality of components.

2. The circuit of claim 1, wherein the circuit is a system on chip.

3. The circuit of claim 2, wherein the subset of the plurality of components are system on chip masters that can drive a communication transaction.

4. The circuit of claim 1, wherein the shared resource is a bus.

5. The circuit of claim 1, wherein the shared resource is a communication channel.

6. The circuit of claim 1, wherein an assignment of lottery tickets is based on assigning priorities among the subset of the plurality of components, with a component having a highest priority receiving a maximum number of lottery tickets.

7. The circuit of claim 4, wherein each component from the subset of the plurality of components has a preassigned share of bandwidth

8. The circuit of claim 4, wherein a component from the subset of the plurality of components can request allocation of the bus for transferring multiple words.

9. The circuit of claim 8, wherein a maximum limit is placed on a number of bus cycles that can be allotted to a component.

10. The circuit of claim 1, wherein operations of the lottery manager are pipelined with actual data transfers to minimize idle bus cycles.

11. The circuit of claim 1, wherein a number of tickets assigned to each of the subset of the plurality of components is statically chosen.

12. The circuit of claim 11, wherein the number of tickets to be assigned to each of the subset of the plurality of components is stored apriori in the lottery manager.

13. The circuit of claim 11, wherein the lottery manager further comprises:

- a range calculator adapted to calculate a range between 0 and a positive number, the range being for each of the components in the 5 subset of the plurality of components, the range corresponding to the number of lottery tickets held by said each of the components;
- a random number generator adapted to generate a random number between zero and the positive number;
- a set of look up tables, that store ranges calculated for the 10 subset of components;
- a comparator adapted to compare the random number with the ranges; and

a priority selector that selects a grant component from the subset of components based on the comparison performed in the comparator.

14. The circuit of claim 13 where the positive number is a total number of all lottery tickets held by the subset of components which have pending requests.

15. The circuit of claim 13, wherein the random number generator is a linear feedback shift register.

16. The circuit of claim 1, wherein a number of tickets assigned to each of the subset of the plurality of components is dynamically chosen.

17. The circuit of claim 16, wherein the lottery manager further comprises:

- 5 a bitwise AND calculator adapted to receive a set of request lines corresponding to the subset of components and a number of tickets currently possessed by each of the subset of components;
- 5 a range calculator adapted to calculate a range between 0 and a positive number, for each of the components in the subset of the

plurality of components, the range corresponding to the number of lottery tickets held by said each of the components;

10 a random number generator adapted to generate a random number;

 a modulo operator adapted to perform a modulo operation based on the random number and a sum of the ranges to create a number between zero and the positive number;

15 a comparator adapted to compare a result of the modulo operation and the ranges; and

 a priority selector that selects a grant component from the subset of components based on the comparison performed in the comparator.

18. A method of assigning a shared resource to competing components in a circuit, said method comprising:

 (a) determining priority from among the competing components;

5 (b) assigning lottery tickets to the competing components, with a number of lottery tickets being proportional to the priority of the competing components.

 (c) probabilistically selecting a component based on the number of lottery tickets; and

10 (d) assigning the shared resource to the component.

19. The method of claim 18 wherein hybrid static priority technique is used in conjunction with other resource allocation techniques.

20. The method of claim 18 wherein time division multiplexing technique is used in conjunction with other resource allocation techniques.